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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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09/844,959

04/27/2001

Mikhail Rodionovich Baklanov

IMEC100.001DV1

1445

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7590

01/05/2005

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EXAMINER

TRINH, HOA B

ART UNIT

PAPER NUMBER

2814

DATE MAILED: 01/05/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/844,959

Applicant(s)

BAKLANOV ET AL.

Examiner

Vikki H. Trinh

Art Unit

2814

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 24 October 0403.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 11-14 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 11-14 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

DETAILED ACTION

Claims 11-14 are pending in this present application.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

3. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

4. Claims 11-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cooney, III et al. (6,066,577) (hereinafter Cooney) in view of Chiang et al. (6,309,956) (hereinafter (Chiang)).

Cooney, III et al. (6,066,577) discloses an IC comprising an interconnect structure having a dielectric layer 28 (col. 4, line 66). The dielectric layer 28 includes at least a portion of a hard mask layer 22, wherein the hard mask 22 comprising a silicon dioxide film (col. 5, line 13) such that a portion of the film is fluorinated (col. 5, line 7). See figure 2F.

However, Cooney does not teach that the film is an organic film material.

Chiang et al. '956 teaches a semiconductor device having an organic dielectric film/layer 140 (col. 2, lines 60-65) with a low dielectric constant to replace silicon dioxide material (col. 1, lines 40-41).

Therefore, it would have been obvious to one skilled in the art at the time the invention was made to modify the invention of Cooney with an organic dielectric layer, as taught by Chiang et al., so as to provide a reduce capacitance. (Chiang et al., col. 3, line 9).

As to claim 12, Chiang et al. (6,309,956) discloses the patterned organic film 140 is a patterned low-K organic polymer film. See column 3, lines 8-9.

As to claim 13, Cooney teaches the surface has fluorinated portion 22 and the interior 28 has non-fluorinated portion. See column 2, lines 60-68 and col 5, line 51.

As to claim 14, Cooney teaches that depending on the selection of materials for the K value of the fluorinated portion (col. 5, lines 7-13), that k value may be less than the K value of the non-fluorinated portion (col. 4, lines 66-67). (For example, the K value for the fluorinated silicon dioxide is less than the K value for the non-fluorinated silicon nitride).

Response to Arguments

1. Applicant's arguments with respect to claims 11-14 filed on Oct. 24, 2004, have been considered, but they are not deemed persuasive.

2. In the remarks, applicant contends that Cooney and Chiang do not render obvious with respect to the present application's claims, because Cooney and Chiang do not disclose every element of the present invention's claims. On the contrary, Cooney and Chiang do teach every element of the present application's claims.

Under 35 U.S.C. section 103(a) rejection, the examiner looks toward the factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Here, as stated in the above rejection, Cooney discloses an IC comprising an interconnect structure having a dielectric layer 28 (col. 4, line 66). The dielectric layer 28 includes at least a portion of a hard mask layer 22, wherein the hard mask 22 comprising a silicon dioxide film (col. 5, line 13) such that a portion of the film is fluorinated (col. 5, line 7). See figure 2F.

However, Cooney does not teach that the film is an organic film material.

Chiang teaches a semiconductor device having an organic dielectric film/layer 140 (col. 2, lines 60-65) with a low dielectric constant to replace silicon dioxide material (col. 1, lines 40-41).

Therefore, it would have been obvious to one skilled in the art at the time the invention was made to modify the invention of Cooney with an organic dielectric layer, as taught by Chiang et al., so as to provide a reduce capacitance. (Chiang, col. 3, line 9).

Accordingly, applicant admits (remarks, page 3, line13) that Cooney teaches a fluorine “doping” rich insulating layer and Chiang teaches an organic polymer dielectric (remarks, page 3, lines 17-18) and other dielectric layers with fluorinated doping. However, applicant argues that they do not teach an organic polymer film that “functions” as a hard mask. The examiner notes, as set forth in the above, a summary of the factual inquires to determine obviousness under 25 U.S. C. 103 (a). Furthermore, the mask layer’s functionality is inherent. Moreover, any functionality factor of an element in this present application’s claims has been considered, but the function of the element does not structurally distinguish it from the cited prior art.

For the foregoing reasons, the rejection above is properly maintained.

Conclusion

Any inquiry concerning this communication or earlier communications from the Examiner should be directed to Vikki Trinh whose telephone number is (571) 272-1719. The Examiner can normally be reached from Monday-Friday, 9:00 AM - 5:30 PM Eastern Time. If attempts to reach the examiner by telephone are unsuccessful, the Examiner’s supervisor, Mr. Wael Fahmy, can be reached at (571) 272-1705. The office fax number is 703-872-9306.

Any request for information regarding to the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Also, status information for published applications may be obtained from either Private PAIR or Public Pair. In addition, status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. If you have questions

pertaining to the Private PAIR system, please contact the Electronic Business Center (EBC) at 866-217-9197 (toll free).

Lastly, paper copies of cited U.S. patents and U.S. patent application publications will cease to be mailed to applicants with Office actions as of June 2004. Paper copies of foreign patents and non-patent literature will continue to be included with office actions. These cited U.S. patents and patent application publications are available for download via the Office's PAIR. As an alternate source, all U.S. patents and patent application publications are available on the USPTO web site (www.uspto.gov), from the Office of Public Records and from commercial sources. Applicants are referred to the Electronic Business Center (EBC) at <http://www.uspto.gov/ebc/index.html> or 1-866-217-9197 for information on this policy. Requests to restart a period for response due to a missing U.S. patent or patent application publications will not be granted.

Vikki Trinh,
Patent Examiner
AU 2814



HOWARD WEISS
PRIMARY EXAMINER